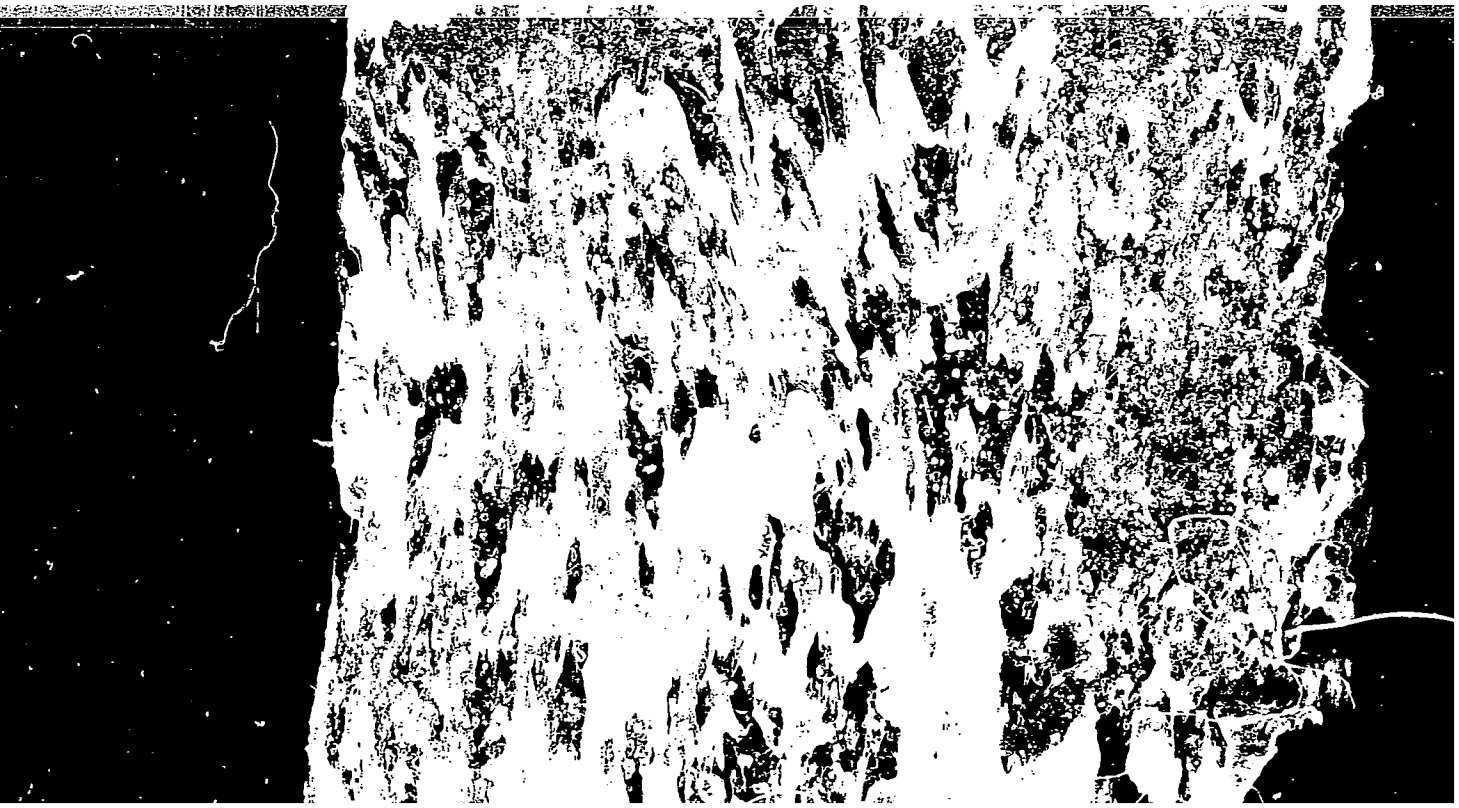

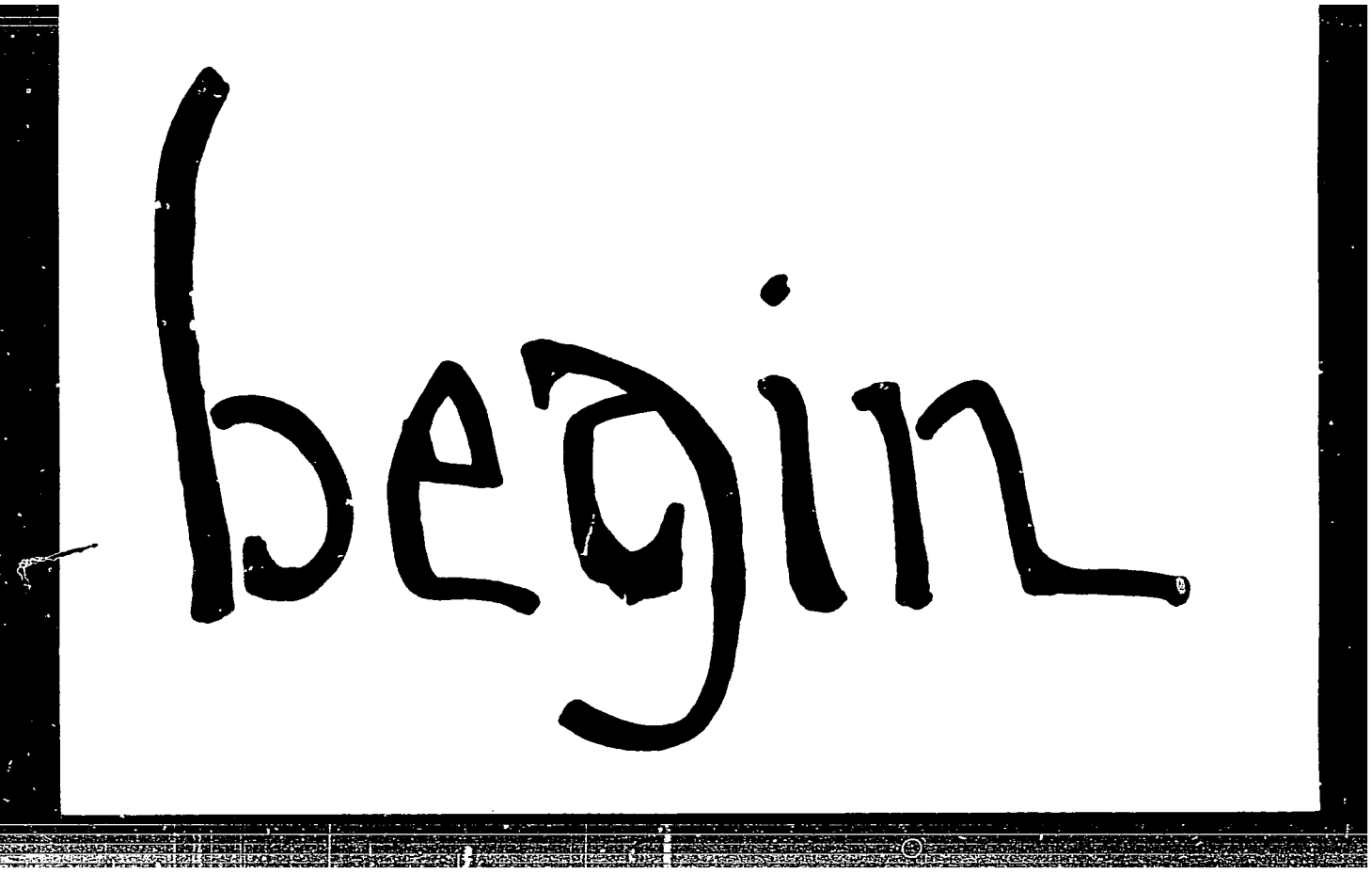

GRIGOROVICH, V.K., kandidat tekhnicheskikh nauk; MALYSHEV, N.I., inzhener.

Simulated defects revealed during the testing of steel parts with magnetic powder. Podshipnik no.5:24-25 My '53. (MLRA 6:5)
(Steel--Testing)

FIL'CHENKOV, I.F., inzh.; MALYSHEV, N.I., inzh.

Concrete based on artificial sand obtained from the wastes of crushing carbonate rock. Sbor.trud.VNIINerud no.1:40-54 '62.
(MIRA 15:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut nerudnykh stroitel'nykh materialov i gidromekhanizatsii.
(Concrete) (Rocks, Carbonate)

L 9878-66 EWT(1)

ACC NR: AP5025159 SOURCE CODE: UR/0188/65/000/005/0045/0048

AUTHOR: Chechernikov, V. I.; Speranskiy, N. M.; Malyshev, N. I.
44,55 44,55 44,55

76
73
B

TITLE: Electrical, thermal, and some magnetic properties of nickel-cadmium ferrites 21,44,55

SOURCE: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 5, 1965, 45-48 44,55

TOPIC TAGS: ferrite, nickel compound, cadmium compound, electric resistance, heat conductivity, hardness, magnetic susceptibility, crystal lattice

ABSTRACT: A study was made of the electric resistivity (ρ), heat conductivity coefficient (λ), magnetic susceptibility, microstructure, and microhardness of nickel-cadmium ferrites containing variable amounts of Fe_2O_3 (55.1-68.6), NiO (3.9-39.4), and CdO (2.9-40.7%). The electric resistivity was measured by the 2-probe method in the temperature range of 20-900C, i.e. in the ferro - and paramagnetic regions. The rectilinear curves of log $\rho = f(1/T)$ in all samples

Card 1/3 UDC: 621.318.13:53

L 9878-66

ACC NR: AP5025159

had inflections, before and after which the known law $\rho = Ae^{(F/kT)}$ was applicable. The electric resistivity (ρ) and the energy of activation (A), according to the value of the curve inclinations, decreased with increased amounts of cadmium in the nickel-cadmium ferrites. It was possible that the increased amount of cadmium ions changed the lattice constant and the distribution of ions in the sublattice. The effect of temperature on heat conductivity (λ) was studied in the temperature range of 20-500C by the V. E. Mikryukov and N. M. Speranskii method (Inzhenerno-fizicheskii zhurnal VI, 1962). The λ in each sample was constant. This indicated that the law λ T const., which was supposedly characteristic of bodies having a thermal lattice conductivity, was not applicable to the nickel-cadmium ferrites. The thermal conductivity of nickel-cadmium ferrites was basically affected by the lattice vibrations. The value of λ decreased with increased amounts of cadmium ferrites. This was evidently caused by structure distortions in the lattice affected by the addition of cadmium ions having an atom radius much larger than nickel and iron. A study of the microstructure of samples suggested that the thermal conductivity of nickel-cadmium ferrites decreased with increased average grain size. Magnetic susceptibility at 100-200C, i.e. in the region of the Curie point, changed little and monotonically. Then it decreased rapidly with decreased temperature

Card 2/3

L 9878-66
ACC NR: AP5025159

3

and at $T>\Theta_f$ followed the Neel law. The magnetic susceptibility near the Curie ferromagnetic point ($T \geq \Theta_f$) was a function of the magnetic field intensity. The study showed that both the electric and the heat conductivity in nickel-cobalt ferrites behaved in the same manner. The electric conductivity was caused mainly by electron transitions between the iron ions, whereas thermal conductivity was controlled by lattice vibrations. The authors thank Professor E. I. Kondorskii for his advice. Orig. art. has; 2 figures and 1 table.

44,55

SUB CODE: MM,IC/ SUBM DATE: 12May64/ NR REF SOV: 002/ OTHER: 000

Card 3/3

L [illegible] EWT(m)/EWP(w)/ [illegible] IJP(c) JD/[illegible]

ACC NR: AT6020976 SOURCE CODE: UR/0000/66/000/000/0071/0075

AUTHORS: Chechernikov, V. I.; Speranskaya, N. M.; Malyshev, N. I.

ORG: none

TITLE: Magnetic, thermal, and electrical properties of nickel-cadmium ferrites

SOURCE: Vsesoyuznoye soveshchaniye po ferritam. 4th, Minsk. Fizicheskiye i fizikokhimicheskiye svoystva ferritov (Physical and physicochemical properties of ferrites); doklady soveshchaniya. Minsk, Nauka i tekhnika, 1966, 71-75

TOPIC TAGS: ferrite, electric resistance, magnetic susceptibility, heat conductivity, nickel compound, cadmium compound

ABSTRACT: Specific electrical resistance, heat conductivity, and magnetic susceptibility of nickel-cadmium ferrites have been studied as functions of temperature within a temperature range up to 800C. The chemical composition of the specimens is listed in Table 1

Specimen	Chemical analysis, wt.%		
	Fe_2O_3	NiO	CdO
1	65.2	24.4	10.4
2	63.9	20.8	15.3
3	61.8	17.5	20.7
4	61.4	14.3	24.3
5	57.6	5.4	37.0
6	55.4	0	44.6

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At these conditions it is possible to observe the variations of physical properties in ferrites changing from a normal spinel structure to mixed and reversed structure. The effect of temperature upon the heat conductivity λ and upon specific electrical conductivity ρ of various compositions of this ferrite system is illustrated in Figs. 1 and 2. A definite correlation was established between the

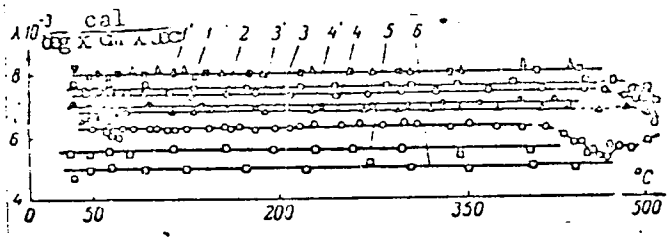

Fig. 1. Coefficient of thermal conductivity for Ni-Cd ferrites as a function of temperature (see Table for composition)

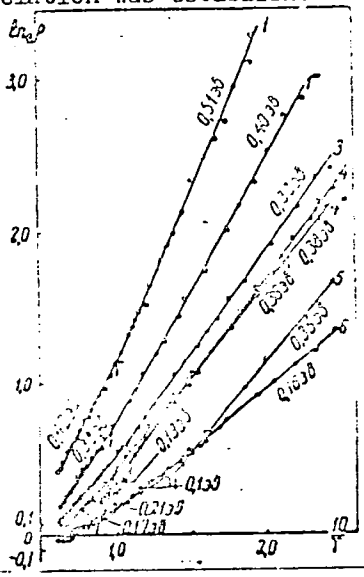

Fig. 2. $\ln \rho$ for Ni-Cd ferrites as a function of $1/T$ (see Table for composition)

ACC NR: AT6028976

investigated properties, especially a regularity between the temperature and composition of the ferrite, on one hand, and the specific electrical resistivity and heat conductivity, on the other. The obtained data indicate that the decisive role in determining these properties is played by the electrons located in apices of the crystal lattice. Orig. art. has: 1 table and 4 figures.

SUB CODE: 11, 20/ SUBM DATE: 22Dec65/ ORIG REF: 003

Card 3/3

L 08398-67 EWT(m)/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6032176 SOURCE CODE: UR/0069/66/028/005/0692/0695

AUTHOR: Martynenko, G. P. (Moscow); Malyshev, N. I. (Deceased; Moscow)

ORG: none

TITLE: Adsorption of copper from aqueous solutions on the surface of gallium arsenide

SOURCE: Kolloidnyy zhurnal, v. 28, no. 5, 1966, 692-695

TOPIC TAGS: gallium arsenide, adsorption, copper

ABSTRACT: The adsorption of copper ions on polished gallium arsenide from aqueous HCl, KOH, H_2SO_4 and H_2O solutions was studied by using the Cu^{64} radioisotope tracer. The absorption isotherms were determined, and it was found that the adsorption increases with decreasing pH of the solution. Maximum adsorption was observed in the case of KOH. At a Cu^{64} concentration of 10^{-7} g/ml in the alkaline solution, the adsorption amounted to 5×10^{-8} g/cm^3. In all cases (H_2O, acidic and alkaline solutions) the adsorption was irreversible. The distribution of copper over the surface of gallium arsenide was determined by radiography and showed that the adsorption is most pronounced in pits, cracks, scratches, fused metal contacts, and p-n junctions. In order to minimize contamination with copper, acid rather than alkaline etchants are recommended for treatment of gallium arsenide surfaces. Orig. art. has: 3 figures.

SUB CODE: 07,20/ SUBM DATE: 24Mar65/ OTH REF: 006

Card 1/2 afs UDC: 541.183.24

VASIL'YEV, L.L.; MALYSHEV, N.N.

Effect of aeroionization on the healing rate of experimentally produced burns. Uch.zap.Len.un.no.138:212-227 '52. (MLRA 9:6)

1.Otdel obshchey fiziologii nervnoy sistemy Leningradskogo instituta mozga imeni V.M.Bekhtereva.
(ELECTROTHERAPEUTICS)

MALYSHEV, N.Z.

Lvov Motorbus Plant. Avt. prom. no.1:39-40 Ja '58. (MIRA 11:2)

1. L'vovskiy avtobusnyy zavod.
(Lvov--Automobile industry)

MALYSHEV, P.

Methodology for calculating differential incomes. Vop.ekon. no.5: 97-102 My '61. (MIRA 14:5)
(Tatarsk District--Collective farms--Finance)

AUTHORS: Malyshev, P.K., and Vasil'yev, N.V.

TITLE: The Welding of Primary Cast Iron Parts by the Cold Method (Svarka otvetstvennykh chugunnykh detaley kholodnym sposobom)

PERIODICAL: Tsement, 1958, Nr 6, pp 31-32 (USSR)

ABSTRACT: At cement plants, many piston engines are used. These engines often break down because of crack formation in the piston heads. It is here recommended to weld these cracks using a method developed by the engineer, M.V. Lyubimov. The welding may be done with a-c of 50 to 100 amp. depending on the thickness of the welded part. The electrode is made of red copper wire 3-6 mm in diameter. Tin plating 6-9 mm broad is wound around it (Figure 2). The electrode is coated with a flux. The welded part must be 1.5 - 3 mm distant from the electrode. For welding cast

The Welding of Primary Cast Iron by the Cold Method

iron parts, a steel electrode of 3-5 mm in diameter is used. For welding the piston of the diesel engine MAN, groovers are made (Figure 4), to which 4 welding seams are applied with different electrodes. There are 4 diagrams.

Card 2/2

MALYSHEV, P. M., [illegible], G. B., [illegible], P. A.

"A mixed infection of cattle with [illegible] rickettsiosis and brucellosis," p. 129

Desyatoye Soveshchaniya po parazitologicheskim problemam i prirodnoochagovym boleznyam. 22-29 Oktyabrya 1959 g. (Tenth Conference on Parasitological Problems and Diseases with Natural Foci 22-29 October 1959), Moscow-Leningrad, 1959, Academy of Medical Sciences USSR and Academy of Sciences USSR, No. 1 [illegible] .

AUTHORS: Mikhaylov, P.A., Cand. of Tech. Sciences; [illegible] Eng; and Duplenko, Yu.V., Eng.

TITLE: Experimental Data on the Anti-Friction Properties of Kapron (Caprone) (Nekotoryye eksperimentalnyye dannyye ob antifrikstionnykh svoystvakh kaprona)

PERIODICAL: Vestnik Masninostroyeniya, 1959, Nr 2, pp 35-36 (USSR)

ABSTRACT: Tests were made on simulated bearings with strips of caprone supporting a steel shaft 30 mm diameter. Rubbing speed varied from 0.417 to 2.4 metres/sec under bearing pressures of 30 to 55 kg/cm^2. Fig 1 shows turning moment versus total revolutions for different loads at a constant rubbing speed of 0.524 m/sec. Fig 2 shows coefficient of friction against bearing pressure. In both cases the bearing was lubricated with machine oil. Fig 3 shows the same but without circulation of oil i.e. without cooling. Fig 4 shows the relation between friction and rubbing speed using an auto-lubricant. Fig 5 shows friction versus bearing pressure and rubbing speed for polyamide specimens containing 2 to 2.5% of "silver graphite", again lubricated with an auto-lubricant. The authors' conclusions are: caprone parts

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Experimental Data on the Anti-Friction Properties of Caprone

can work satisfactorily under moist conditions since their swelling on water absorption is negligable. Caprone parts do not absorb mineral oil and cannot dry-out and are consequently more suitable than leather or oil-resistant rubber for hydraulic packings. Caprone liners and sleeves can be used for anti-friction parts with thick or with liquid lubricants. The coefficient of friction against steel using liquid lubricant without cooling is little different from the coefficient of friction of a bronze bearing and the wear coefficient of caprone is 10 to 100 times less than with lubricated bronze and steel friction pairs. Under conditions of reduced lubrication caprone bearings should have graphite added but, with sufficient lubrication, graphited caprone is not advantageous. The cost of caprone parts per unit volume is 6 times less than the cost of the cheapest bronze parts. Caprone sleeves and liners can be used instead of "Textolite" and laminated wood for lubricated

Card 2/3

Experimental Data on the Anti-Friction Properties of Naphtha

machine parts which are not [illegible] working temperature does not exceed 8[illegible] There are 5 figures.

Card 3/3

S/[illegible]/60/000/004/008/015
B016/B056

AUTHORS: Mikhaylov, P. A., Duplenko, Yu. V., Malyshev, P. N.

TITLE: The Antifriction Properties of Caprone

PERIODICAL: Plasticheskiye massy, 1960, No. 4, pp. 38-41

TEXT: The authors report on their studies of the physico-mechanical and antifriction properties of caprone in the Laboratory "Detali mashin" (Machine Parts) of the Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye Machine Construction Institute) in cooperation with plants of the Zaporozhskiy sovnarkhoz (Zaporozh'ye Council of National Economy). The dependence of the friction coefficient on the specific pressure, rubbing speed, type of lubricant, and manufacturing method of the caprone parts was studied. A specially redesigned "MI" ("MI") machine was used for this purpose. The following caprone samples were studied: 1) large samples from the Zaporozhskiy zavod "Kommunar" (Zaporozh'ye "Kommunar" Plant); 2) samples molten in an autoclave; and 3) samples produced with the extruder press designed by the authors. Moreover, samples were studied which contained graphite, aluminum, and bronze powders, as well as metal samples

Card 1/3

covered by a caprone layer 0.1 to 0.3 mm thick. The authors drew the following conclusions on the basis of their results: 1) Caprone may be used for bearings with lubricants of low and high viscosity. The friction coefficient of caprone on steel with lubricants of low viscosity and without cooling differs only slightly from that of bronze. The wear of a caprone bearing and a steel shaft operating with lubricants is very low compared to the wear of a bronze bearing and a steel shaft. 2) The use of caprone with graphite addition is recommended for friction with sparse lubrication. 3) The loading capacity of metal bearings with caprone coating is much higher than that of pure caprone bearings. 4) Caprone bearings operate satisfactorily at a lubricating-oil temperature of up to 80-85°C. 5) The antifriction properties of caprone depend on its manufacturing method. The friction coefficient and wear of caprone samples made with an extruder press are lower than those of samples produced by other means. 6) The antifriction properties of caprone are impaired by normalizing in boiling water. 7) The addition of aluminum and bronze powders reduces the shrinkage of caprone parts, increases their thermal conductivity, but does not improve their antifriction properties. 8) Special attention should be paid to structural changes of caprone during normalizing. The authors suggest

The Antifriction Properties of Caprone S/191/60/000/004/008, 015
B016/B058

studies on the optimum processes and means of caprone heat treatment. They point out that caprone can also be used under operational conditions. There are 9 figures.

Card 3/3

MIKHAYLOV, P.A., kand.tekhn.nauk, dotsent; DUPLENKO, Yu.V.; MALYSHEV, P.N., assistent.

Data on properties of capron as a m[illegible] in the [illegible] of machinery. Izv.vys.ucheb.zav.; [illegible] 58-66 [illegible].
(MIRA 13:1a)

1. Zaporozhskiy mashinostroitel'nyy institut.
(Materials) (Nylon)

S/081/62/000/016/028/043
B168/B186

AUTHORS: Mikhaylov, P. A., Duplenko, Yu. V., Malyshev, P. N.

TITLE: Antifriction properties of caprone

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 16, 1962, 525, abstract 16P97 (In collection: Plastmassy v mashinostr. i priborostr., Kiyev, Gostekhizdat USSR, 1961, 341-348)

TEXT: The authors investigated the physical, mechanical and antifriction properties of caprone as an engineering material, determining the friction coefficient in its dependence on specific pressures, sliding velocities, type of lubricant and technology used for manufacture of the caprone components. It was found that caprone bushes and collars can be widely used at friction points with thin and heavy lubricants at ≤ 80-$85^{\circ}C$; that under conditions of friction with degraded lubrican it is advisable to use caprone with graphite added; that the antifriction properties of caprone vary with the technology used in processing it; that normalization of caprone in boiling water reduces its antifriction properties; and that introduction of aluminum and bronze powder into the caprone reduces

Card 1/2

Antifriction properties of caprone..

S/081/62/000/016/028/043
B168/B186

shrinkage of caprone components and raises their thermal conductivity, but does not improve their antifriction properties. [Abstracter's note: Complete translation.]

Card 2/2

S/653/61/000/000/ 4/051
I042/I242

AUTHORS: Mikhaylov, P.A., Malyshev, P.N., and Duplenko, Yu.V.

TITLE: A high-speed screw press for processing polyamides

SOURCE: Plastmassy v mashinostroyenii i priborostroyenii. Pervaya resp. nauch.-tekh. konfer. po vopr. prim. plastmass v mashinostr. i priborostr., Kiev, 1959. Kiev, Gostekhizdat, 1961, 503-509

TEXT: The screw press described here is superior to other such presses because the high turning speed of its screw minimizes the thermal destruction of the material and insures a uniform temperature distribution in the melt. The high-speed screw press works well when the material is heated by its own friction. The application of vacuum to the melt during its transport by the screw decreases sharply its content of low-molecular weight fractions and allows

Card 1/2

S/653/61/000/000/044/051
I042/I242

A high-speed screw press for processing...

the utilization of waste material. The productivity of the high-speed press is higher than that of other screw presses and generally decreases with increasing grain size of the raw stock. Parts produced by the screw press have better mechanical properties and are turned out faster than those produced by casting machines or autoclaves. There are 6 figures.

Card 2/2

MIKHAYLOV, R.A.; MALYSHEV, P.N.; DUPLENKO, Yu.V.

High-speed screw press for processing polyamides. Plast.massy no.1: 49-52 '61. (MIRA 14:2)
(Polyamides) (Power presses)

MIKHAYLOV, P. A., kand. tekhn. nauk; DUPLENKO, Yu. V., inzh.;
MALYSHEV, P. N., inzh.

Operating conditions of the capron-steel bearing pair. Mashinostroenie no.5:81-85 S-O '62. (MIRA 16:1)

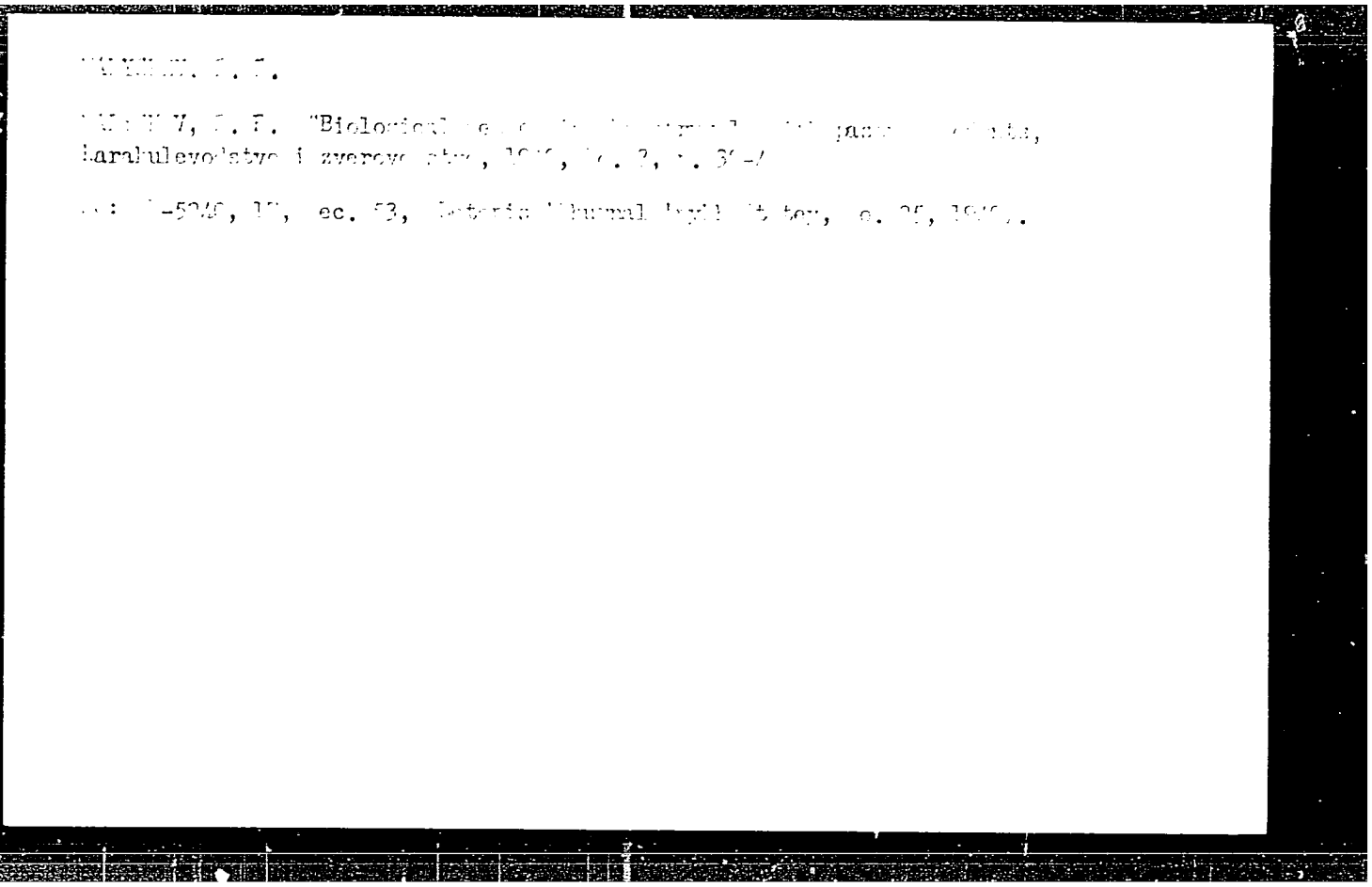
1. Zaporozhskiy mashinostroitel'nyy institut.

(Bearings(Machinery))

ABRAMOV, V.V.; M.KHAYLOV, [illegible].A.; [illegible], A.A.; MARYUSHEV, [illegible].S.; [illegible], Yu.V.

Mechanical methods of testing residual stresses in composition materials. Fiz.-khim. mekh. mat. 1 no.5:605-[illegible] 165.
(MIRA 19:1)

1. Mashinostroitel'nyy Institut imeni Chubarya, Zaporozh'ye.



AVER'YANOV, I YA., MALYSHEV, P. I., PUDAGOV, S. V.

Karakul Sheep

Ratio of sexes in karakul lambs under various conditions of rearing.
Kar. i zver., 5, N. 1, 1962.

Monthly List of Russian Accessions, Library of Congress, June 1962. Unclassified.

MAIYSH T, P. P.

Karakul Sheep

Practice of leaders in organization of feeding and keeping karakul sheep during the summer, Kar. i zver., 5, no. 3, 1958.

MONTHLY LIST OF RUSSIAN ACCESSIONS. Library of Congress, October 1958. UNCLASSIFIED.

MALYSHEV, R.A.; DANILOV, N.N.

Asiatic snipe Capella stenura Bp. of the Polar Urals. Trudy Inst. biol. UFAN SSSR no.38:149-151 '65.

(MIRA 18:12)

MALYSHEV, S.; PROTOPOPOV, S.

A stable transistor amplifier. Radio no.3:28-29 Mr '62.
(MIRA 17:7)

MALYSHEV, S.A.

Fuel Abstracts
Vol. 14 No. 4
October 1953
Domestic Heating,
Cooking, Lighting,
Etc.

SOV/112-57-6-12491

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1957, Nr 6, p 127 (USSR)

AUTHOR: Svenchanskiy, A. D., Malyshev, S. A.

TITLE: Performance of Heaters in High-Temperature Electrical Resistance Furnaces (Rabota nagrevatel'nykh elementov v vysokotemperaturnykh elektricheskikh pechakh soprotivleniya)

PERIODICAL: Tr. Mosk. energ. in-ta, 1956, Nr 22, pp 155-173

ABSTRACT: Heater design methods were checked by a specially-constructed experimental installation. The temperature of heaters and the heated body was measured by chromel-alumel thermo-couples; various types of heaters having equal radiating areas were compared. On the basis of experiment, curves were constructed showing the dependence of temperature of a heated body on the power transmitted to the body from the heater for various placements of the heaters within the heating chamber. The experiments showed that the estimated temperatures of various construction heaters were close to the actual temperatures, and that the adopted design methods were accurate

Card 1/2

Performance of Heaters in High-Temperature Electrical Resistance Furnaces

enough to be used for free-radiating heaters as well as for ribbon and wire heaters placed on a shelf. The shelves should be spaced 85-90 mm or more to avoid shielding and excessive temperature of heaters. The heater ribbon width should be not less than 15 mm to avoid the shielding effect of the shelf boards. To limit mutual shielding between the turns, the minimum pitch of the wire heaters on shelves should be equal to twice the wire diameter, or should exceed 2-2.5 times the ribbon width. All experimental data are tabulated.

B.S.B.

MALYSHEV, S.A., inzh.

Experimental investigation of heat transmission and hydraulic resistance of furnace charges in circulation-type electric resistance furnaces. Trudy MEI no.30:269-286 '58. (MIRA 12:5)

1.Moskovskiy ordena Lenina energeticheskiy institut, Kafedra elektrotermicheskikh ustanovok.
(Electric furnaces) (Heat--Transmission)

SOURCE: Ref. zh. Metallurgiya, Abs. 5V299

AUTHOR: Shelyanskiy, M. Ya.; Malyshev, S. A.; Tkachev, ... G.; Gutterman, K. D.

TITLE: Investigation of the process of overheating a metal during electron beam melting

CITED SOURCE: Elektrotermiya. Nauchno-tekhn. sb., vyp. 39, 1964, 18-20

TOPIC TAGS: overheating, melting, metal, electron beam melting, electron beam heating, metal vaporization, melting point, temperature dependence, iron, zirconium, molybdenum

TRANSLATION: In the laboratory of a MEI electrothermal installation, an investigation was made of the process of remelting Armco iron, zirconium, and molybdenum in an electron beam furnace using a 112 mm diameter ingot mold and 150 kilowatts of power. At the time of melting the temperature of the metal was measured with an optical pyrometer with an accuracy of 60-70°. The measurements showed that in melting the above mentioned metals, they can be heated considerably above the melting temperature. With an increase in power supply, the degree of

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L 56087-65

ACCESSION NR: AR5015149

overheating increases, but not proportionally. In melting the metal with a view to refining it, it is expedient to raise the temperature of the bath up to such a point where losses of the metal by vaporization do not exceed acceptable limits. 2 figures, 2 tables. D. Kashaeva.

SUB CODE: MM ENCL: 00

Card 2/2

VOLOKH, Yu.A.; MALYSHEV, S.B.

Echinococcosis in southern Kirghizia. Izv. AN Kir. SSR. Ser. biol. nauk 2 no.6:41-48 '60. (MIRA 14:6)
(KIRGHIZISTAN--HYDATIDS)

MALYSHEV, S.B.

Echinococcosis as revealed by autopsy material from hospitals in Frunze. Izv. AN Kir. SSR. Ser. biol. nauk 2 nø.6:65-71 '60. (MIRA 14:6)

(FRUNZE--HYDATIDS)

MALYSHEV, S.I.

Using metal forms in making bent hardened automobile glass. Stek. i ker. 17 no.12:15-16 D '60. (MIRA 13:11)
(Automobiles--Windows and windshields)

ABEL'CHUK, N.A.; MALYSHEV, S.I.; LUKONIN, G.A.

Apparatus for the horizontal bending and tempering of windshield glass. Stek. i ker. 18 no.6:9-11 Je '61.
(MIRA 14:7)
(Glass manufacture) (Automobiles—Windows and windshields)

MALYSHEV, S. I.

"Ways and conditions of evolution of the instincts of the lower hymenoptera." (Symphyta & Terebrantia) by Malyshev, S. I. (p. 13)

SO: Journal of General Biology, (Zhurnal Obshchei Biologii) Vol. X, No. 1, 1949

MALYSHEV, S. I.

"Methods and Conditions of Evolution of Bee-Like Hymenoptera (Vespoidea and Sphecoidea)",

SO: Dok, AN, 65, No. 4, 1949.

Mbr., Inst. of Evolutionary Physiol. & Pathol. of the Higher Nervous Activity im. I. P. Pavlov, Acad. Med. Sci., -c1949-.

1. MALYSHEV, S.I

2. USSR (600)

4. Bees

7. Ways and conditions under which instinct of bees (Hymenoptera, Apoidea) develops in the process of evolution. Trudy Vses. ent. obshch. 43, 1951

9. Monthly List of Russian Accessions, Library of Congress, March 1953, Unclassified

MALYSHEV, S.I.

Nesting habits of the relict wasp Discoelius zonalis Panz. (Hymenoptera, Vespidae). Ent.oboz. 32:183-191 '52. (MLRA 7:1)
(Wasps)

MALYSH[illegible], [illegible]. I., [illegible]ZA[illegible]A-MALY[illegible]A, [illegible]

Sawflies

[illegible] of sawflies ([illegible], [illegible]), [illegible].
[illegible] -va [illegible]

[illegible] List of Russian Accessions, [illegible]
[illegible]

MALYSHEV, S.I.

"The origin and evolution of parasitism of ichneumon flies and their development in the U.S.S.R." N.A. Telenga. Reviewed by S.I. Malyshev. Zool.zhur. 32 no.3:559-562 My-Je '53. (MLRA 6:6)
(Ichneumonidae) (Parasites) (Telenga, N.A.)

MALYSHEV, S.I.

Factors and conditions affecting the development of ants (Hymenoptera, Formicoidea). Dokl.AN SSSR 94 no.6:1185-1188 F '54. (MLRA 7:2)
(Ants)

USSR/General and Special Zoology - Insects. P.

Abs Jour : Ref Zhur - Biol., No 7, 1958, 30511

Author : Malyshev, S.I.
Inst :
Title : The Ways and Conditions of the Evolution of Instincts in Wasp-like Hymenoptera.

Orig Pub : Tr. Vses. entomol. o-va, 1956, 45, 3-50.

Abstract : The evolution of instincts of wasp-like Hymenoptera passed through a number of stages: first (pompiloid) -- characterized by the paralysis of the prey and subsequent preparation of the dwelling; second (sphecoid) -- during which the building of the dwelling was followed by the preparation of one gib prey specimen; third (crabroid) -- different from the second by the preparation of smaller prey, cought one at a time; the fourth (bembecoid) -- the laying of an egg on the first prey and providing for the larva bit by bit; fifth (moneduloid) -- the laying of eggs

Card 1/2

MALYSHEV, S.I.

Modes and conditions of the origin of Hymenoptera terebrantia s. parasitica. Dokl. AN SSSR 109 no.5:1053-1055 Ag. 1956.
(MLRA 9:10)

1. Institut evolyutsionnoy fiziologii Akademii nauk SSSR i Khoperskiy gosudarstvennyy zapovednik. Predstavleno akademikom L.A. Orbeli.
(Hymenoptera, Fossil)

P

COUNTRY : USSR
CATEGORY : General and Specialized Zoology, Insects. Biology and Ecology
ABS. JOUR. : RZhBiol., No. 22 1958, No. 100779

AUTHOR : Malyshev, [illegible]
INST. : Leningrad Society of Experimenters of Nature
TITLE : The Origin of Secondary Phytophagia in Ichneumon Flies (Hymenoptera Terebrantia s. Parasitica)

ORIG. PUB. : Tr. Leningr. o-va estestvoispyt., 1957, vol.73, No. [illegible], [illegible]-56

ABSTRACT : Plant-eating ichneumon flies, seed-eaters and gall-producers belonging to the families Eurytomidae, Torymidae, Cynipidae, and others, arrived at this form of life following a period of time in an archaic in[illegible] phase which was common to all ancestors of the parasitic Hymenoptera. Of primary significance is the connection of these plant-eating forms with the generative organs of plants, so that grain or seed-eaters may be considered plant ovum-eaters - phyto-

CARD: 1/2

MALYSHEV, Sergey Ivanovich, prof.; ZALESSKIY, Yu.M., red.; LIPKINA, T.G., red.izd-va; PAVLOVA, V.A., tekhn.red.

[Hymenopterons, their origin and evolution] Pereponchatokrylye, ikh proiskhozhdenie i evoliutsiia. Moskva, Gos.izd-vo "Sovetskaia nauka," 1959. 290 p. (MIRA 13:5)
(Hymenoptera)

MALYSHEV, S.I.

Paths and conditions of the evolution of ants (Hymenoptera, Formico-idea). Trudy Inst.morf.zhiv. no.27:249-260 '59.
(MIRA 13:2)

1. Institut evolyutsionnoy fiziologii AN SSSR i Khoperskiy gosudarstvennyy zapovednik.
(Ants)

MALYSHEV, S.I.

Paths and conditions of the development of archaic trigonalid ichneumon flies (Hymenoptera: Trigonalidae). Mat. po evol. fiziol. 4:91-99 '60. (MIRA 13:10)
(ICHNEUMON FLIES) (INSECTS--DEVELOPMENT)

MALYSHEV, S.I.

Evolutionary paths and conditions of the development of instincts in ants (Hymenoptera, Formicoidea). Trudy Vses.ent.ob-va 47: 5-52 '60. (MIRA 13:6)

(Ants) (Phylogeny)

MALYSHEV, I.I.

A [illegible] of the life [illegible] upland wasps (Hymenoptera, Braconidae). Ent. [illegible] 53. '58.

1. Institut evolyutsionnoy fiziologii imeni I.M.Sechenova [illegible], Leningrad, i Kuybyshevskiy [illegible].

MALYSHEV, S.I. (Leningrad)

Formation of flowering plants in the light of the evolution of the behavior of wasplike ancestors of bees (Angiospermae, Vespiformia s. Lat.). Usp. sovr.biol. 57 no.1:159-174 Ja-F '64.
(MIRA 17:4)

MALYSHEV, S.I., inzh.; KHOSHTARIYA, Sh.F., inzh.; GLADKOSKOK, P.P., inzh.; RADCHENKO, F.G., inzh.; Prinimali uchastiye: BOKOLISHVILI, Sh.S.; RUKHADZE, R.I.; SHARASHIDZE, S.Sh.; BEREZHNOY, N.; GORDEZIANI, N.N.; RUKHADZE, D.A.; TATARADZE, Z.

Mastering the sintering of Dashkesan ores as acceptable charge for open-hearth furnaces. Stal' 20 no. 7:584-590 Jl '60. (MIRA 14:5)

1. Zakavkazskiy metallurgicheskiy zavod.
(Dashkesan--Iron ores) (Sintering)
(Open-hearth furnaces--Equipment and supplies)

OYKS, G.N., prof., doktor tekhn.nauk; LOLUA, K.K., inzh.; SHARADZENIDZE, S.A., inzh.; MALYSHEV, S.I., inzh.

Making capped steel with a two-layer crystal structure for the manufacture of seamless tubes. Biul.TSIICHM no.4:13-21 '61. (MIRA 14:10)

(Steel--Metallography) (Pipe, Steel)

22312

S/133/61/000/004/001/015
A054/A127

18 3200

AUTHORS: Oyks, G. N., Doctor of Technical Sciences, Professor; Sharadzenidze, S. A., Engineer; Svetlitskiy, Ye. A., Engineer; Malyshev, S. I., Engineer; Lolua, K. K., Engineer, and Mindlin, B. I., Engineer

TITLE: Production of tubes from semi-killed steel with a double-layer crystalline structure

PERIODICAL: Stal', no. 4, 1961, 304 - 307

TEXT: Tests were carried out on automated manufacture of seamless tubes from semi-killed steel, instead of from killed steel as in the conventional process. A metal was required, incorporating the advantages of both killed and rimming steels. For this pupose rimming steel smelted in openhearth furnaces was cast in ingot molds with widened bases, into 5.5 - 6.3 ton ingots. Without interrupting the metal flow, aluminum granules (250 - 100 gr/ton of steel) were introduced during pouring in the central zone of the casting (the carbon-content varied correspondingly between 0.11 and 0.23%). Aluminum was added. Upon adding aluminum, the outer layers of

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Production of tubes from semi-killed steel...

the metal which were in contact with the mold wall, were already crystallizing and formed a low-carbon, sulfur- and phosphorus-free rimming skin, while, at the same time the core of the ingot was still liquid. Aluminum kills the rimming metal of the core, while the rate of oxidation can be controlled by the amount of aluminum added. Provided deoxidation was carried out in the correct way, the ingot consists of a) a soft, blister-free rimming skin, on an average 12 - 20 mm thick and b) a semi-killed core with uniform liquation of carbon, sulfur and phosphor, (not exceeding 130%), in vertical and transversal direction. The average rate of the rising of the metal in the mold was 0.28 - 0.32 m/min. The 250 x 310 mm and 280 x 310 mm blooms made of the test steel were put into the pusher-type furnace of the tube-rolling mill. The surface of the blooms is remarkably clean, not displaying any of the usual flaws of killed steel. The blooms were rolled on 400 mm stands, with the working rolls having the following angles of inclination: 8 - 9° for 168 x 6 mm tubes, 8 - 9° for 219 x 7 - 8 mm and 7 - 8° for 325 x 8 mm tubes. The piercing tests showed that the test metal was more strongly affected by the changes in temperature than billets made of killed steel. The test billets could not be pierced at 1190°C, whereas in

Production of tubes from semi-killed steel...

the conventional process piercing can easily be performed at 1150 - 1180°C. However, even when the temperatures were sufficiently high (1230 - 1260°C), the rejects amounted to 8%, as a result of incorrect adjustment of the first piercing stand. The hardness of the billet is not uniform in its cross-section (Fig. 2). The core is harder, than the external layers. The failure of the piercing tests could be eliminated by modifying some of the rolling parameters. The inclination of the rolls in the first stand was reduced by 1°, reduction at the neck of the rolls was increased by 2.7 - 2.8% and drawing out the nosepiece of the mandrel by 22 - 25%. By decreasing the inclination angle of the working rolls, friction and pulling forces increased whereas axial slip decreased. As a result of the increased reduction, the central parts were processed more thoroughly and piercing was promoted. The above mentioned changes in rolling parameters decreased the amount of non-piercable billets from 8% to 1.7%. Non-piercing of the billets can be entirely eliminated by raising the cropping of the top to 2 - 3%. A further cropping (3 - 4%) should be carried out for the 900 mm stand. The quality of the tube surface with double-layer structure is satisfactory. The rate of flawless products increased to 95 - 98%. The mechanical properties of the tubes made of the test steel complies with ГОСТ (GOST) 8731-58

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A054/A127

Production of tubes from semi-killed steel...

for killed steel (Ст.2, Ст.3 etc. Ст = St). There are 4 figures and 3 Soviet references.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute) and Zakavkazskiy metallurgicheskiy zavod (Zakavkaz Metallurgical Plant)

Card 4/5 4

KASHAKASHVILI, N.V.; SHARADZENIDZE S.A.; MALYSHEV, S.I.; CHKHEIDZE, Z.A. GIBRADZE, Sh.S.; KHOSHTARIYA, Sh.P.; RUKHADZE, D.A.; SHARASHIDZE, S. Sh. Prinimali uchastiye: SHENGELAYA,V.; OKROMCHEDLISHVILI, Sh.; POPIASHVILI, Sh.; LOLUA,K.; MINDELI, M.; TSKHELISHVILI, D.; GORDEZIANI, N.; ODIKADZE, Ch.; TATARADZE, Z.; KHUTSISHVILI, A.

Production and use of highly basic, open-hearth furnace sinters from Dashkesan iron ore. Trudy GPI [Gruz.] no.4:25-32 '62
(MIRA 17:8)

MALYSHEV, S.I.; KUDRYAVTSEV, N.P.; KARTA, V.G.

Mastering the rolling of beam columns on the rail and structural steel 800 mill. Stal' 23 no. 3 253-255 Mr '64. (MIRA 17:5)

KUDRYAVTSEV, N.P.; RAMO RAO, A.G.; MALYSHEV, S.I.

Rolling H-beams on the 350 semicontinuous mill at the "Bkhilaiskii" Metallurgical Plant. Stal' 24 no.5:443-444 My '64. (MIRA 17:12)

MALYSHEV, S.P.; PROTOPOPOV, S.P.

Quick-acting secondary device based on electric-contact method. Biul.tekh.-ekon.inform.Gos.nauch.-issl.inst.nauch. i tekh.inform. no.3343-45 '63. (MIRA 16:4)

(Electronic instruments)

GLUKHOVSKOY, K., inzh.; KRYLOV, N., kand.tekhn.nauk; MALYSHEV, V., inzh.

Acoustical and radiometric methods of inspecting the quality of building materials and structural elements. Na stroi. Ros. no.11:16-18 N '61. (MIRA 16:7)
(Building materials--Testing)

ALEKSEYEV, [illegible] A[illegible]; [illegible] A[illegible] vich;
[illegible], [illegible], red.

[illegible]. [illegible]kva, [illegible]izdat, [illegible] 7 p.
([illegible])

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R001032010001-3"

SOV/58-59-5-10959

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 5, p 150 (USSR)

AUTHOR: Malyshev, V.A.

TITLE: Analysis of the Time Course of the Exciton Photoeffect

PERIODICAL: Tr. Taganrogsk. radiotekhn. in-ta, 1957, Vol 3, Nr 2, pp 117 - 127

ABSTRACT: The author calculates the time course of the photoeffect for the following mechanism: a crystal is irradiated with light corresponding to the exciton absorption band; the excitons approach the metalloid vacancies, are annihilated, and create F-centers; other excitons in transit approach the F-centers and create photoelectrons and metalloid vacancies on account of their excitation energies. The author derives approximate expressions for the variation with time of the photocurrent (in relative units) for colored and uncolored crystals after the inception of protracted irradiation, as well as after the discontinuation of irradiation when the latter has lasted a given short interval of time.

Card 1/2

Analysis of the Time Course of the Exciton Photoeffect SOV/58-59-5-10959

It is possible to determine the parameters of exciton excitation with the aid of the derived relationships and the experimental data on the optical measurements and time course of the photoeffect. (Arker, I.; Taft, E., Phys. Rev., 1950, Vol 79, Nr 6, pp 964 - 966).

G.E. Levin

Card 2/2

SOV/58-59-4-8881

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 4, p 218 (USSR)

AUTHOR: Malyshev, V.A.

TITLE: Methods for Determining the Equivalent Circuit Parameters of a Resonator Connected Into an Arbitrary Section of the Transmission Line

PERIODICAL: Tr. Taganrogsk. radiotekhn. in-ta, 1958, Vol 2, pp 55 - 62

ABSTRACT: A method is proposed for determining the parameters of the equivalent circuit of a cavity resonator connected into an arbitrarily chosen section of the transmission line. This method is based on the taking into account of the effect of coupling with the non-resonating oscillations of the resonator.

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SOV/141-2-3-18/26

9,2580, 4,3260
AUTHOR: Malyshev, V.A.

TITLE: The Theory of Very High Frequency Oscillators with a Resonating Load

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 3, pp 463 - 472 (USSR)

ABSTRACT: The operation of a particular class of oscillators is considered to which, in addition to the useful load, a supplementary resonator is connected by a transmission line. The oscillating mode is symmetrical; the 'long-line effect' is neglected. Other topics treated are: mode jump, electronic tuning bandwidth and slope. Any oscillat. can be represented by the simple diagram of Figure 1a, where a non-linear element is connected to a tuned circuit. The operation is described by Eq (1), where the F-function refers to the oscillation characteristic of the generator and the δ-function to the phase of the electronic conductance of the generator. The criterion for the stability of the stationary state is Eq (2) and for the maintenance of oscillations is Eq (3), where $u_1 = 0$ in the 'soft'

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The Theory of Very High Frequency Oscillators with a Resonating Load

regime and $u = u_1$ (a critical value in Eq (2)) in the 'hard' regime. The class of oscillators studied satisfy the following conditions:
1) the phase of the electronic conductance hardly changes with frequency and amplitude;
2) the variation of δ with power supply variation is symmetrical with respect to the value at mode centre;
3) there is a 'soft' excitation regime;
4) the oscillation characteristic is almost constant over the mode.
These conditions are satisfied by monotrons, by some klystrons, including reflex klystrons and by certain other values. Two methods of connecting the supplementary resonator are distinguished: direct connection by a transmission line to the main cavity; connection in series to the load. The general equation, written for the present case, is given in Eqs (8) and (9), the parameters being defined in Eqs (5), (6) and (7). When the electrical length

 of the transmission line is short, the total width of the

electronic tuning range is given in Eq (13) and the width to the "u-times-down" power level in Eq (14). The stabilizing factor is defined in Eq (15). The conditions for mode symmetry are most succinctly expressed by Eq (25) in terms of the wavelengths and qualities of the two resonators. In the more general case, where the electrical length of the line is small but not equal to $n\pi$ the frequency-phase curve has the shape in Figure 2a. There are three zero phase points, but y_3 is always unstable.

The electronic tuning range is now Eq (43). Two important parameters in this discussion are r, z in Eq (22). The choice of these parameters controls the width of the e.t.r. and the widening possible. The mode-centre tuning slope is in Eq (57), the mode-width at mode-centre power is given in Eq (58) and the width between power peaks in Eq (59). When the resonator is connected in series with the load the same formulae apply but the factors affecting the parameter D , Eq (35), are different.

67541

SOV/141-2-3-18/26

The Theory of Very High Frequency Oscillators with a Resonating Load

There are 2 figures and 5 references, 4 of which are Soviet and 1 English.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut (Taganrog Radio Engineering Institute)

SUBMITTED: January 8, 1958

Card 4/4

9(2) 24.2600

AUTHOR: Malyshev, V.A.

TITLE: On the Theory of Frequency Characteristics of Photoresistors and Luminophores

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. [illegible]
1959, Vol 2, Nr 5, pp 814 - 818 (USSR)

ABSTRACT: The author explains the theory of the dependence of the frequency characteristics of photoconductance and luminescence on the type of electronic processes taking place within photoresistors or luminophores. He discusses linear and square recombination law, and derives formulas describing the frequency response. The formulas show that the generalized frequency characteristics of photoresistors and luminophores are identical at high frequencies for both recombination mechanisms and are subject to the law of inverse proportionality. The graph in Figure 1 may be used for determining the

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On the Theory of Frequency Characteristics of Photoresistors and Luminophores

the type of recombination mechanism by the shape of the frequency characteristics. The law of luminous flux modulation, which is different from the law of rectangular modulation, may be used for plotting the frequency characteristic. The peculiarities of the frequency characteristics distinguishing the recombinations laws from each other, are preserved also with other types of modulation. The frequency characteristics of specimens of industrial photoresistors, plotted according to the law of luminous flux modulation, show in the authors opinion that a monopolar recombination takes place (at 20°C, in PbS-Al lead sulfide photoresistors and a bipolar recombination in FS-K1 cadmium sulfide photoresistors. The frequency characteristics shown in this paper for the two recombination mechanisms are correct in the first approximation also for conductance excited in matter by

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SOV/142-[illegible]

On the Theory of Frequency Characteristics of Photoresistors and Luminophores

electron pulses (cathode conductance), and for [illegible] luminescence. The formulas will produce the more accurate results, the lower the intensity of the primary radiation and the greater the energy of electrons. The article was recommended for publication by the Kafedra elektrovakuumnoy tekhniki (Department of Electrical Vacuum Engineering) of the Taganrogskiy radiotekhnicheskiy institut (Taganrog Radio Engineering Institute). There are 1 graph and 1 Soviet reference.

ASSOCIATION: November 18, 1958 and, after re-working, February 4, 1959

Card 3/3

85999

9,2586 (also 3302)

AUTHOR: Malyshev, V.A.

TITLE: Experimental Verification of the Theory of Ultrahigh-frequency Oscillators with Resonance Loading

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 3, pp. 452 - 455

TEXT: The oscillators considered are characterised by the presence of an additional resonator which is coupled to the principal resonator by means of a transmission line. Reflex klystrons represent one class of such oscillators. The theoretical formulae are those from an earlier work (Ref. 1). All the formulae are valid for the symmetrical oscillation zones, the condition of symmetry being expressed by:

$$\lambda_1 = \lambda_2 \frac{Q_{B2}\left[\operatorname{ctg}(\beta\ell) + 2Q_{B1}\right]}{Q_{B1}\left[\operatorname{ctg}(\beta\ell) + 2Q_{B2}\right]} \qquad (1)$$

where λ_1 and λ_2 are the resonant wavelengths of the auxiliary and the principal resonator, Q_{Bi} and Q_{B2} are

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Experimental Verification of the Th[illegible] of Ultrahigh-f[illegible] ency Oscillators with Resonance Loading

"external" quality factors of the resonators with respect to the coupling line, $\beta\ell$ is the electrical length of the coupling line. The wavelength generated in the centre of the zone λ_o is determined from

$$\lambda_1 - \lambda_o = \frac{\lambda_o}{2Q_{B1}} \operatorname{tg}(\beta\ell) \qquad (2)$$

while the range of electronic tuning between the points of maximum power output ($\Delta\lambda_M$) and the points having power equal to that of the centre of the zone ($\Delta\lambda_{0,}$) can be determined from Eqs. (3) and (4).

where Q_{01} is the inherent quality factor of the auxiliary resonator. The parameters r and z are determined by Eqs. (5), where Q_{OH2} is the quality factor of the principal

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Experimental Verification of the Theory of Ultrahigh-frequency Oscillators with Resonance Loading

resonator. In the earlier work (Ref. 1), it was also shown that when the coupling parameter $z > 1$, a discontinuity $\Delta\lambda$ in the wavelength is observed; this is determined by Eqs. (6) The validity of the above formulae was checked experimentally. The experiments were carried out on a klystron where the auxiliary resonator was connected to the principal resonator separately from the useful load. First, the quantities Q_{01}, Q_{B1}, Q_{OH2}, Q_{B2} and λ_2 were determined for a cold klystron. The auxiliary resonator was then connected to the principal resonator by means of a coaxial line and the generation zones were observed on the oscillograph. By varying λ_1 and $\beta\ell$, it was possible to obtain symmetrical zones and to study their characteristics. The experimental results are shown in Figs. 1-4. The function $\lambda_1 = f(\beta\ell)$ is illustrated in Fig. 1 (see Eq. 1). The circles on the figure illustrate the experimental points, while the straight lines show the

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Experimental Verification of the Theory of Ultrahigh-frequency Oscillators with Resonance Loading

calculated λ_1. The experimental points, together with the theoretical line, for the function given by Eq. (4), are illustrated in Fig. 2. The curves of functions expressed by Eqs. (3) and (4) are shown in Fig. 3. the circles denote the experimental points, while the solid lines show the calculated curves. The "solid" curve of Fig. 4, representing the function of $1/\Delta\lambda = f(z)$ was calculated on the basis of Eq. (6); the circles of Fig. 4 give the experimental points. From the figures it is concluded that Eqs. (1), (3), (4) and (5) give correct results. The author expresses his gratitude to P.N. Faktorovich and G.M. Svinarev for their help in carrying out the experiments. There are 4 figures and 1 Soviet references.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut
(Taganrog Radio engineering Institute)

SUBMITTED: November 5 1959

Card 4/4

9.3260

AUTHOR: Malyshev, V.A.

24378
S/142/60/003/005/005/015
E192/E382

TITLE: Method of Spectral Linearisation in the Theory of Oscillators and Some of Its Applications

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiotekhnika, 1960, Vol. 3, No. 5, pp. 474 - 485

TEXT: The general problem in the theory of oscillators, with one nonlinear element, consists of solving the direct and indirect design problems. The first problems can be formulated as follows. For a given nonlinear element and oscillator system, it is necessary to determine the shape of the generated oscillations and the frequency of the fundamental harmonic. The second problem amounts to the determination of the parameters of the nonlinear element or of the oscillator circuit which would produce the desired waveform and frequency of the oscillations. In the following an attempt is made to tackle these problems by employing the method developed by G.Ye. Pukhov (Ref. 1: Complex Variable Calculus and its Application, Taganrog, 1956).

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Method of ....

The method can be referred to as the method of spectral linearisation. An oscillator can be represented in the form of two bipoles: a nonlinear bipole containing the nonlinear element H3 (Fig. 1a) and a linear element representing the oscillator circuit. Sometimes, an oscillator circuit is represented in the manner shown in Fig. 1б but this is equivalent to the circuit in Fig. 1a. In the following it is assumed that the oscillator circuit is in the form shown in Fig. 1б. The nonlinear element is approximated by a function $i = \Phi(U)$, where U is the voltage. The Kirchhoff equation for the system is:

$$\frac{d^2U}{dt^2} + \frac{1}{RC}\frac{dU}{dt} + \frac{1}{C}\frac{d\Phi(U)}{dt} + \frac{1}{LC}U = 0. \qquad (1)$$

In general, U as a function of time can be represented as the Fourier series:

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Eq. (1) on page 475 attached to 24

$$U(t) = \frac{1}{2j} \sum_{n=-\infty}^{\infty} \bar{U}_n e^{jn\omega t}; \qquad (2)$$

$$\bar{U}_n = \frac{j^n}{T} \int_0^T U e^{-jn\omega t} dt.$$

From the above it follows that

$$-\frac{d\Phi(U)}{dt} = \sum_{n=-\infty}^{\infty} \left(\frac{1}{R} + j\omega nC + \frac{1}{j\omega nL}\right) n\bar{U}_n \frac{\omega}{2} \cdot e^{jn\omega t}. \qquad (3)$$

where the expression in brackets denotes the admittance $\bar{Y}_n$ of the resonance circuit at the n-th harmonic. Eq. (3) can therefore be written as Eq. (4). By multiplying all terms of Eq. (4) by 2j/T exp(jωvt)dt and integrating from zero to T, Eq. (4) can be written as:

$$\bar{F}_\nu (U) + \bar{Y}_\nu \bar{U}_\nu = 0 \qquad (5)$$

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where $\overline{F}_\nu$ is the ν-th complex harmonic of the function $\overline{\Phi}$.

If it is sufficient to consider k harmonics, the equation can be written as:

$$\overline{Y}_\nu + \frac{2f}{\overline{U}_\nu T}\int_0^T e^{-j\nu\omega t}\,\Phi\left[\frac{1}{2f}\sum_{n=-k}^{k}\overline{U}_n e^{jn\omega t}\right]dt = 0. \qquad (6)$$

The above equation has $2k + 2$ unknowns which include the biasing voltage component U_o, amplitudes and phases of the harmonics and the frequency ω of the fundamental. On the basis of the above equation it is possible to solve the two oscillator problems. The case of a single-harmonic approximation is considered as an example. In this case, Eq. (6) can be represented as:

$$\overline{Y} + \frac{F(U_o,\omega,U)}{U}\,e^{-j[\beta(U_o,\omega,U)+\varkappa]} = 0, \qquad (7)$$

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where

$$F(U_0,\omega,U)\,e^{-j[\delta(U_0,\omega,U)+\pi]} = \frac{2j}{T}\int_0^T e^{-j\omega t}\,\Phi(U_0+U\sin\omega t)\,dt. \qquad (7a)$$

In the above expression the initial voltage phase is assumed to be zero and U_o represents the operating point. The function F can be referred to as the oscillation characteristic of the oscillator and the quantities F/U and δ represent the modulus and phase of the negative admittance. From Eq. (7) it is found that

$$G = \frac{F(U_0,\omega,U)}{U}\cos[\delta(U_0,\omega,U)]; \qquad (8)$$

$$\frac{B}{G} + \operatorname{tg}[\delta(U_0,\omega,U)] = 0, \qquad (9)$$

where $G + jB = \bar{Y}$. Thus, Eqs. (8) and (9) fully determine

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the amplitude and frequency of the generated oscillations. On the basis of the A.M. Lyapunov theory (Ref. 5 - Gvosdover, S.D. Theory of Electron Devices for Ultrahigh Frequencies, GITTL, 1956) the condition of the stability of the oscillations is in the form:

$$\frac{\partial}{\partial U}\left[\frac{F(U_0,\omega,U)}{U}\cos\delta(U_0,\omega,U)\right]<0. \qquad (10).$$

If this condition is met for any U smaller than those determined by Eqs. (8) and (9), the oscillator operates under conditions of "weak" excitation. On the other hand, the self-excitation condition requires that:

$$c \geq G \qquad (11)$$

where:

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$$c = \lim_{U \to 0} \left[\frac{F(U_0, \omega, U)}{U} \cos \delta (U_0, \omega, U) \right]. \qquad (11a) .$$

In order to determine the behaviour of the oscillator in the presence of higher harmonics and to evaluate the spectral content of the generated oscillations it is necessary to employ the method of successive approximations. Eq. (6) now results in a system of k+1 equations of the type:

$$\overline{Y}_\nu + \frac{F_\nu (U_0, \omega, \overline{U}_1, \overline{U}_2, \ldots, \overline{U}_k)}{U_\nu} e^{-j\delta_\nu (U_0, \omega, \overline{U}_1, \overline{U}_2, \ldots \overline{U}_k) + \varphi_1} = 0, \qquad (13)$$

where k is the number of harmonics which describe the process, F_ν is the oscillation characteristic of the non-linear element with respect to the ν-th harmonic and δ_ν is the phase of the negative admittance for this harmonic. These quantities are given by:

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$$F_\nu e^{-j(\delta_\nu - \psi_\nu + \pi)} = \frac{2j}{T}\int_0^T e^{-j\omega\nu t}\,\Phi\left[\frac{1}{2j}\sum_{n=-k}^{k}\bar{U}_n e^{j\omega n t}\right]dt, \qquad (14)$$

where ψ_ν is the phase of the complex amplitude of the ν-th harmonic. Eq. (13) permits determination of the amplitude and phase of all the harmonics. It should be borne in mind, however, that only those harmonics are present in the oscillations for which the oscillation stability conditions are met. It is therefore possible to obtain k inequalities in the form of Eq. (10) which determine those harmonics which exist in the oscillations. It is now necessary to exclude from Eq. (13) those harmonics which do not satisfy Eqs. (10). The number of harmonics in Eq. (13) is therefore reduced and the procedure is repeated until all the harmonics of Eq. (13) satisfy the stability conditions of Eq. (10). In the case of solving the indirect problem it is necessary to construct a system of equations of the type of Eq. (13), which represent all the given harmonics. This will determine the parameters of the

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system and the nonlinear element, the number of the parameters being equal to the double number of harmonics plus one. In general, the current-voltage characteristic of most nonlinear elements can be represented by a polynomial of the type:

$$I = \sum_{i=0}^{n} a_i U^i \qquad (15) .$$

Consequently, the oscillator characteristic of the nonlinear element with respect to the $\sqrt{}$-th harmonic is represented by:

$$F_{\nu} e^{-j(\theta_{\nu}-\psi_{\nu}+\pi)} = \sum_{l=0}^{n} a_l \left(\frac{1}{2\bar{j}}\right)^{(l-1)} \underbrace{\sum_{r=-(k+\nu)}^{r-k+\nu} \sum_{s=-(k+\nu)}^{s-k+\nu} \sum_{q=-k}^{q-k}}_{(l-1)\text{ раз}} \times$$

$$\times \underbrace{\bar{U}_{(r-\nu)} \bar{U}_{(r-s)} \ldots \bar{U}_{q}}_{l \text{ множителей}} \qquad (16)$$

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provided the process is described by k harmonics; the quantity δ_ν and ψ_ν in Eq. (16) can be determined from Eq. (14). In the case of dynatron and transitron oscillators it can be assumed that in Eq. (15) n = 3 . The coefficients of the polynomial for these oscillators can be expressed by:

$$a_0 = I_{a0} - SE + \frac{SE^3}{3p^2}; \qquad a_1 = S(D + \bar{K}_\nu)\left(1 - \frac{E^2}{p^2}\right);$$

$$a_2 = \frac{SE}{p^2}(D + K_\nu)^2; \qquad a_3 = -\frac{S}{3p^2}(D + \bar{K}_\nu)^3, \qquad (17)$$

where S is the slope of the tube,
p the saturation voltage,
E the bias voltage,
D is the inverse amplification factor, and
$\bar{K}_\nu$ is the complex transfer coefficient of the feedback circuit for the ν-th harmonic.

For the purposes of investigating these oscillators it is assumed that it is sufficient to consider only three harmonics.

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It is shown on the basis of Eqs. (16) and (14) that provided the parameters of the oscillation system are known it is possible to determine six equations for the quantities U_1, U_2, U_3, Ψ_2, Ψ_3 and ω. The inverse problem for the dynatron is also considered. The use of the above equations is illustrated by analysing an oscillator. For this purpose, a single-harmonic approximation is employed and it is assumed that the phase-shift between the anode and grid voltages is arbitrary. The author expresses his gratitude to his collaborators at the Chair of Electrovacuum Technology of Taganrog Radiotechnical Institute and to A.V. Kalyayev for discussing this work. There are 2 figures and 5 Soviet references. One of the references is translated from English.

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